We claim:

1. A method of stabilizing porous silicon comprising the steps of:

preparing a porous silicon structure having a surface terminated with hydrogen atoms; and

subjecting said porous silicon structure to organic thermal processing with reactants selected from the group consisting of: RCH=X, R^1R^2C=X, where X= O, NR', S) and RNu, where Nu = OH, NHR', SH, COOH, to substitute said hydrogen atoms with a protective organic layer, and wherein the reactants are purified to free them of peroxide and hydroperoxide impurities prior to said thermal processing and the length of the carbon chains in the reactants is greater than or equal to 8.

2. A method as claimed in claim 1, wherein said reactants are aldehydes.

3. A method as claimed in claim 1, wherein said organic thermal processing is carried out in the absence of an external catalyst.

4. A method as claimed in claim 1, wherein said protective organic layer has a thickness is equal to or less than the length of the molecules of said reactants.

5 A method as claimed in claim 4, wherein said protective organic monolayer comprises bonds selected from the group consisting of: Si-C and Si-O-C.

6. A method as claimed in claim 1, wherein said organic thermal processing comprises reacting said porous silicon structure with reactants selected from the group consisting of: octyl and decyl aldehydes.

7. A method as claimed in claim 6, wherein said organic thermal processing takes place at a temperature of between 50°C and 250°C.

8. A method as claimed in claim 7, wherein said organic thermal processing at a temperature of between 85°C and 115°C .

9. A method as claimed in claim 8, wherein said porous silicon structure is reacted with an aldehyde at about 85°C.

10. A method as claimed in claim 1, wherein said reactants are purified prior at said thermal processing step by distillation.

11. A method as claimed in claim 10, wherein prior to thermal processing the silicon structure is rinsed with an organic solvent and then dried.

12. A method as claimed in claim 11, wherein said organic solvent is ethanol.

13. A method as claimed in claim 11, wherein said silicon structure is dried by exposure to an inert gas flow.

14. A method as claimed in claim 13, wherein said inert gas is selected from the group consisting of argon and nitrogen.

15. A method as claimed in claim 1, wherein the reactants are deoxygenated prior to thermal processing.

16. A method as claimed in claim 1, wherein a small amount of oxidation is permitted to occur during said thermal processing.

17. A method as claimed in claim 16, wherein said porous silicon structure is thermally reacted with ethyl undecylenate to produce a surface bearing an ester function at the end of an Si layer.

18. A method as claimed in claim 17, wherein said thermal processing takes place at 85°C.

19. A method of making a porous silicon structure, comprising:

treating a silicon wafer in an aqueous acid solution to remove native oxide and produce a hydrogen-terminated surface;

electrochemically etching said hydrogen terminated surface to provide a porous silicon film;

providing an aldehyde or thioaldehyde reactant capable of producing a protective organic layer on said structure;

purifying said reactant to remove peroxide and hyperoxide impurities; and

subjecting said porous silicon film to organic thermal processing to substitute said hydrogen atoms in said hydrogen-terminated surface with a protective organic layer.

20. A method as claimed in claim 19 wherein said reactant is purified by distillation.

21. A method as claimed in claim 19, wherein said organic thermal processing takes place in the absence of an external catalyst.

22. A method as claimed in claim 19, wherein said porous silicon film is subjected to organic thermal processing at a temperature between 85 and 115°C.

23. A method as claimed in claim 19, wherein said protective organic layer is an organic monolayer of a thickness substantially equally to the length of molecules in said organic protective layer.

24. A method as claimed in claim 23, wherein said organic monolayer comprises Si-C and Si-O-C bonds.

25. A method as claimed in claim 19, wherein said porous silicon film is reacted with compounds selected from the group consisting of: octyl and decyl aldehydes.

26. A bio or chemical sensor comprising a porous silicon structure made by the process defined in claim 1.

27. A bio or chemical sensor comprising a porous silicon structure made by the process defined in claim 19.

28. A medical device comprising a porous silicon structure made by the process defined in claim 1.

29. A medical device comprising a porous silicon structure made by the process defined in claim 19.

30. An electronic/photonic/optoelectronic device comprising a porous silicon structure made by the process defined in claim 1.

31. An electronic/photonic/optoelectronic device comprising a porous silicon structure made by the process defined in claim 19.

32. A device comprising a porous silicon structure made by the process defined in claim 19 for the detection of DNA or proteins for genomics and proteomics applications.

33. A device comprising a porous silicon structure made by the process defined in claim 19 for the detection of DNA or proteins for genomics and proteomics applications.